UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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KING OF PRUSSIA, PA 19406-1415

January 28, 2011

George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Constellation Energy Nuclear Group, LLC
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 050000317/2010005 AND 05000318/2010005

Dear Mr. Gellrich:

On December 31, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on January 14, 2011, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents three NRC-identified findings and one self-revealing finding of very low safety significance (Green). Three of these findings were determined to involve violations of NRC requirements. However, because these findings are of very low safety significance and because they are entered into your corrective action program (CAP), the NRC is treating these findings as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC's Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region 1; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Calvert Cliffs. If you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I; and the NRC Resident Inspector at CCNPP.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Gordon K. Hunegs, Acting Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-317, 50-318
License Nos.: DPR-53, DPR-69

Enclosure: Inspection Report 05000317/2010005 and 05000318/2010005
w/Attachment: Supplemental Information

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Sincerely,

**/RA/**

Gordon K. Hunegs, Acting Chief
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REGION I

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|---|---|
| Docket Nos.: | 50-317, 50-318 |
| License Nos.: | DPR-53, DPR-69 |
| Report No.: | 05000317/2010005 and 05000318/2010005 |
| Licensee: | Constellation Energy Nuclear Group, LLC |
| Facility: | Calvert Cliffs Nuclear Power Plant, Units 1 and 2 |
| Location: | Lusby, MD |
| Dates: | October 1, 2010, through December 31, 2010 |
| Inspectors: | S. Kennedy, Senior Resident Inspector<br>M. Osborn, Resident Inspector<br>J. Hawkins, Project Engineer<br>R. Rolph, Health Physicist<br>S. Hammann, Senior Health Physicist<br>D. Lawyer Health Physicist<br>S. Ibarrola, Reactor Inspector<br>C. Crisden, Emergency Preparedness Inspector |
| Approved by: | Gordon K. Hunegs, Acting Chief<br>Reactor Projects Branch 1<br>Division of Reactor Projects |

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## SUMMARY OF FINDINGS

IR 05000317/2010005, 05000318/2010005; 10/1/2010 – 12/31/2010; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2: Flood Protection Measures; Maintenance Effectiveness; Operability Evaluations; and Radiation Safety.

The report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Four Green findings, three of which were non-cited violations (NCV), were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

**Cornerstone: Mitigating Systems**

Green. The inspectors identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," because Constellation did not establish and take adequate measures for conditions adverse to quality associated with submerged safety related (SR) cables including the 1A diesel generator (DG) cables. As a result, SR cables were subjected to a submerged environment for unknown or extended periods. Immediate corrective action included entering this issue into their corrective action program (CAP), conducting an operability determination for the 1A DG, and increasing the frequency of manhole inspections.

The finding is more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, repeated submergence of medium voltage cables can cause excessive aging and degradation in the exposed sections of cable, which could significantly shorten its qualified life and cause unexpected failures. The inspectors determined that the finding is of very low safety significance because the finding is a design or qualification deficiency confirmed not to result in a loss of operability. This finding had a cross-cutting aspect in the area of problem identification and resolution, operating experience (OE), because Constellation did not implement and institutionalize OE through changes to station processes and procedures associated with submerged cables (P.2.b of IMC 0310). (Section 1R06)

Green. A self-revealing non-cited violation (NCV) of Technical Specification (TS) 5.4.1.a, "Procedures," was identified because Constellation did not follow written procedures during the calibration of 1TIC10541 temperature controller. As a result, portions of the 1A diesel generator (DG) safety related (SR) ventilation failed to respond as designed, resulting in a low flow condition that challenged the safety function of the 1A DG. Specifically, the incorrect calibration of 1TIC10541 prevented the 1A DG SR ventilation system from fulfilling its design function and caused reasonable doubt whether the 1A DG could fulfill its safety function. Immediate corrective action included declaring the 1A DG inoperable until 1TIC10541 was correctly calibrated and tested, and conducting a prompt investigation into the incorrect calibration of 1TIC1041.

This finding is more than minor because it was associated with the Mitigating Systems cornerstone attribute of human performance and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the improper calibration of 1TIC10541 prevented the 1A DG SR ventilation system from fulfilling its design function and caused reasonable doubt whether the 1A DG could fulfill its safety function. The inspectors determined that the finding was of very low safety significance because the issue was a design or qualification deficiency confirmed not to result in loss of operability or availability of the 1A DG. This finding has a cross-cutting aspect in the area of human performance, work practices, because Constellation did not ensure that personnel do not proceed in the face of uncertainty or unexpected circumstances (H.4.a of IMC 0310). (Section 1R12)

Green. The inspectors identified a finding of very low safety significance because Constellation did not conduct an adequate functionality review following failure of the 0C diesel generator (DG) (the station blackout (SBO) diesel) battery charger. Specifically, Constellation did not take into account the Appendix R mission time in the functionality review. As a result, Constellation did not recognize that the 0C diesel was not available for its Appendix R function with its associated battery charger out-of-service (OOS). Immediate corrective actions included entering this issue in the corrective action program (CAP) and providing instructions to operators to declare the 0C diesel not available anytime its associated battery charger is taken OOS. Additional corrective actions planned include changing OI-26A, "125 Volt Direct Current (VDC) System," to reflect that the battery charger is required to support the 0C diesel functionality.

The finding is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Constellation did not recognize that the 0C diesel generator was not available for its Appendix R function with its associated battery charger OOS. The inspectors determined that the finding is of very low safety significance because it only affected the ability to reach and maintain cold shutdown conditions. The finding has a cross-cutting aspect in the area of human performance, resources, because Constellation did not ensure complete, accurate, and up-to-date procedures (OI-26A) were available and adequate to assure nuclear safety (H.2.c of IMC 0310). (Section 1R15)

**Cornerstone: Radiation Safety**

Green. The inspectors identified a finding of very low safety significance associated with a non-cited violation (NCV) of Technical Specification 5.4.1.a, "Procedures," involving Constellation's failure to implement procedures to calibrate and maintain ventilation and radiation effluent monitoring equipment. Specifically, on December 9, 2010, refurbishment of the steam generator (SG) nozzle dams and manway stud tensioners was in progress in the material processing facility; at that time, only one exhaust train of the ventilation system was in operation and a negative pressure of approximately one-half inch of water was not being maintained. Immediate corrective actions included stopping all work in the building and completing the necessary repairs before restarting activities.

The finding was more than minor because the failure to maintain the ventilation and radiation monitoring equipment affects the Radiation Protection cornerstone to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. The inspectors determined that the finding is of very low safety significance because it did not impair Constellation's ability to assess dose. Constellation did assess dose and the limits of 10 CFR 50 Appendix I and 10 CFR 20.1301(e) were not exceeded. The finding also has a cross-cutting aspect in the area of problem identification and resolution, Corrective Action, because appropriate corrective actions were not taken in a timely manner. The exhaust fan was out-of-service (OOS) for eight months, the supply fan was OOS for seven years, and the radiation monitor was OOS for most of four years (P.1.d or IMC 0310). (Section 2RS01)

**Other Findings**

None

## REPORT DETAILS

Summary of Plant Status

Calvert Cliffs Unit 1 began the inspection period at 100 percent power. On December 18, 2010, operators reduced power to 85 percent to perform main turbine valve testing. Operators returned the unit to 100 percent on the same day. The unit remained at or near 100 percent power for the remainder of the inspection period.

Calvert Cliffs Unit 2 began the inspection period at 100 percent power. On the following dates, operators reduced power to clean condenser waterboxes: October 14, 2010, October 23, 2010, and November 7, 2010. Additionally, on December 5, 2010, operators reduced power to 65 percent to perform maintenance on the 21 steam generator (SG) feed pump. Operators returned the unit to 100 percent on the same day. The unit remained at or near 100 percent power for the remainder of the inspection period.

### 1. REACTOR SAFETY

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

1R01 Adverse Weather Protection (71111.01 – One Sample)

a. Inspection Scope

The inspectors performed a review of cold weather preparations before the onset of the cold weather season to evaluate the site's readiness for seasonal susceptibilities. This review included an assessment of Nuclear Operations Program Procedure NO-1-119, "Seasonal Readiness." The inspectors assessed the effectiveness of the site's cold weather readiness program to ensure that the selected systems would remain functional and available for a plant shutdown during cold weather conditions as required by Technical Specifications (TSs). The inspectors selected the 12 condensate storage tank (CST) and 125 VDC battery rooms. The inspectors verified that the operator actions specified in the associated procedures maintain readiness of essential equipment and systems to preclude weather induced initiating events. The inspectors also discussed the protective measures applicable to the systems with control room operators and the seasonal readiness coordinator.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial Walkdown (71111.04Q – Two Samples)

a. Inspection Scope

The inspectors conducted partial walkdowns to verify equipment alignment of selected risk significant systems. The inspectors reviewed plant documents to determine the

correct system and power alignments, as well as the required positions of critical valves and breakers. The inspectors verified that Constellation had properly identified and resolved equipment alignment problems that could cause initiating events or potentially affect the availability of associated mitigating systems. The inspectors performed a partial walkdown of the following systems:

- P-13000-2 alternate power feed due to planned maintenance on P-13000-1 transformer; and
- Safety injection (SI) alignment due to planned maintenance on 2-SI-148.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05Q – Three Samples)

Fire Protection Tours

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that: combustibles and ignition sources were controlled in accordance with Constellation's administrative procedures; the fire detection and suppression equipment was available for use; passive fire barriers were maintained in good material condition; and compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with Constellation's fire plan.

- Unit 2 west electrical penetration room, fire area 27, room 414;
- Unit 1 coolant charging pump room, fire area 15, room 115; and
- 1A emergency diesel generator (DG), fire area DG 1A, room 1, 2, and 3.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – One Sample)

.1 Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

On October 15, 2010, Constellation performed inspections of cables located in underground bunkers/manholes that were conducted, in part, in response to Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients." The inspectors reviewed applicable documents and observed, by direct observation, Constellation inspection activities of several manholes and underground cable conduits that contain risk significant systems and components. To the extent possible, the inspectors observed cable support structures and cable integrity. In addition, corrective actions associated

with Constellation's underground bunker/manhole cable inspection program were reviewed.

b. Findings

Introduction: The inspectors identified a very low safety significance (Green) NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," because Constellation did not establish and take adequate measures for conditions adverse to quality associated with submerged safety related cables including the 1A DG cables.

Description: In the response to Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," Constellation stated that they conduct approximately annual inspections of manholes and underground vaults for water, and if water is found, it is removed. The response further stated that the purpose of the inspection is to assist in eliminating or reducing the likelihood that these cables are subjected to a wet environment. In addition, Electric Power Research Institute (EPRI) Report TR-103834-PI-2, "Effects of Moisture on the Life of Power Plant Cables," details a study that was performed on medium voltage cable failures in nuclear and fossil power plants. The report concluded that a number of cable failures occurred after cables were damaged during installation or had materials or extrusion problems and were subsequently subjected to water intrusion. The inspectors reviewed Constellation's preventive maintenance inspection routine for safety related (SR) medium voltage cables, and identified corrective action program (CAP) deficiencies related to subjecting SR cables to a submerged environment. CAP deficiencies noted or identified included the following:

- The inspectors identified that Constellation routinely did not enter conditions adverse to quality associated with submerged cables into their CAP. The discovery of submerged cables was normally documented in a work order (WO) but condition reports (CRs) were not initiated. Manholes 1MH-24 and 1MH-9 containing SR cables were identified with submerged cables during the performance of the following WOs but no associated CRs were initiated: C020002390, C0200700255, C020050884, C020041000, C0200102452, and C019972233;
- The inspectors identified that some corrective actions (CAs) were inadequate. On February 2, 2000, Constellation initiated a CR (IR3-005-465) after identifying that a number of SR manholes associated with the 1A DG had not been included in the routine manhole inspection program. Manhole inspection checklist, EPM10120, was updated to include 1MH-24 but did not include four other SR manholes and handholes;
- The inspectors identified that some CAs were not timely. In August 2009, the NRC again noted that several SR manholes associated with the 1A DG had not been inspected since the 1A DG project construction (see above). When the manholes were inspected in October 2010, several submerged cables were identified; and
- The inspectors identified that some degraded conditions that were entered into the CAP were not corrected or evaluated. The inspectors noted that 1MH-24 sump pump discharge pipe outlet had been paved over since at least 2003. Several CRs (IRE-031-858, IR4-026-152, IR4-029-245) were written but the design deficiency was not corrected or formally evaluated.

The inspectors concluded that Constellation did not use the CAP to fully identify, evaluate, and take prompt and adequate CAs associated with submerged medium voltage cables. As a result, SR cables were subjected to a submerged environment for unknown or extended periods. This could have led to cable degradation, increased likelihood of cable failure, and the subsequent failure of risk-significant equipment.

Immediate corrective actions included entering this issue into their CAP, conducting an operability determination for the 1A DG, and increasing the frequency of manhole inspections. Long-term CAs planned include evaluating the need for sump pumps and monitoring equipment based on these increased inspections and including all SR manholes in the preventive maintenance routine. In addition, Constellation recently implemented CNG-AM-1.01-1029, "Medium Voltage Cable Program," Revision 00, which includes the implementation of cable testing as defined by IPEE 400-2001, "IEEE Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems." The inspectors concluded that Constellation had the opportunity to identify and correct the deficiencies in their manhole preventive maintenance routine through use of internal operating experience (OE) and industry OE such as NRC Information Notice 2002-12, "Submerged Safety Related Cables," and Generic Letter 2007-01.

Analysis: The performance deficiency is that Constellation did not establish and take adequate measures for conditions adverse to quality associated with submerged SR cables. As a result, SR cables were subjected to a submerged environment for unknown or extended periods. This finding is more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, repeated submergence of medium voltage cables can cause excessive aging and degradation in the exposed sections of cable, which could significantly shorten its qualified life and cause unexpected failures. The inspectors evaluated this finding using IMC 0609 Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a. The inspectors determined that the finding is of very low safety significance because the finding is a design or qualification deficiency confirmed not to result in a loss of operability. The finding has a cross-cutting aspect in the area of problem identification and resolution, OE, because Constellation did not implement and institutionalize OE through changes to station processes and procedures associated with submerged cables (P.2.b of IMC 0310).

Enforcement: 10 CRF Part 50, Appendix B, Criterion XVI, "Corrective Action," requires licensees to establish measures to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to the above, prior to October 15, 2010, Constellation did not establish and take adequate measures for conditions adverse to quality associated with submerged SR cables including the 1A DG cables. As a result, SR cables were subjected to a submerged environment for unknown or extended periods. This could lead to cable degradation, increased likelihood of cable failure, and the subsequent failure of risk significant equipment. Immediate corrective actions included changing the manhole inspection procedure to include all site manholes, performing an operability determination for the 1A DG, and increasing the frequency of manhole inspections. Because this violation is of very low safety significance and Constellation entered the issue into their CAP (CR-2010-

010865), this issue is being treated as an NCV consistent with Section 2.3.2 of the NRC's Enforcement Policy. (**NCV 05000317/318/20005-01: Inadequate Corrective Actions Associated with Submerged SR Cables**)

1R07 Heat Sink Performance (71111.07A – One Sample)

a. Inspection Scope

The inspectors reviewed the thermal performance test and inspection activities for the 22 Component Cooling (CC) heat exchanger (HX). The inspectors reviewed the performance data and evaluated the test acceptance criteria to ensure that the design basis requirements were satisfied. The inspectors evaluated the heat transfer capabilities based on completed flow verification tests to ensure that specific safety functions could be performed in accordance with design specifications. The inspectors also reviewed Constellation's periodic maintenance methods to verify that they conformed to the guidelines delineated in EPRI Report NP-7552, "Heat Exchanger Performance Monitoring Guidelines."

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – One Sample)

Resident Inspector Quarterly Review

a. Inspection Scope

On November 10, 2010, the inspectors observed a licensed operator requalification scenario to assess operator performance and the adequacy of the licensed operator training program. The scenario involved a loss of all feedwater, a reactor trip, and an anticipated transient without scram. The inspectors verified the clarity and formality of communications, the completion of appropriate operator actions in response to alarms, the performance of timely control board operations and manipulations, and that the oversight and direction provided by the shift manager (SM) were in accordance with Constellation's administrative and technical procedures.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – Three Samples)

Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors reviewed the maintenance effectiveness of the samples listed below for the following: 1) appropriate work practices; 2) identifying and addressing common cause failures; 3) scoping in accordance with 10 CFR Part 50.65(b) of the maintenance rule; 4) characterizing reliability issues for performance; 5) trending key parameters for

condition monitoring; 6) recording unavailability for performance; 7) classification and reclassification in accordance with 10 CFR Part 50.65(a)(1) or (a)(2); and 8) appropriateness of performance criteria for systems, structures, and components (SSCs) classified as (a)(2) and/or appropriateness and adequacy of goals and C/As for SSCs classified as (a)(1).

- 1B DG room exhaust damper failure (CR-2010-008493);
- 1A DG 1TIC10541 temperature controller incorrectly calibrated (CR-2010-00891); and
- 2A DG room exhaust damper failure (CR-2010-008503).

b. Findings

Introduction: A very low safety significance (Green) self-revealing NCV of TS 5.4.1.a, "Procedures," was identified because Constellation did not follow written procedures during the calibration of 1TIC10541 temperature controller. As a result, portions of the 1A DG SR ventilation failed to respond as designed, resulting in a low flow condition that challenged the safety function of the 1A DG.

Description: On September 15, 2010, operators were performing STP-O-008A-1, "Test of the 1A DG and 11 4 Kilovolt (kV) Bus Loss of Coolant Incident (LOCI) Sequencer," when a "SR Supply Fan Flow Low" alarm for the 1A DG ventilation system was received. Operators secured from the test procedure, declared the 1A DG inoperable, and entered TS 3.8.1.B due to SR fan F-10 having a low flow condition. Constellation later determined that the 1TIC10541 temperature controller was calibrated incorrectly during maintenance that occurred on May 27, 2010. The temperature controller was correctly calibrated and tested and the 1A DG was declared operable.

Fans 10 and 12 are considered part of the SR ventilation for the 1A DG and provide cooling to the 1A DG control room, 1E switchgear room, 1A DG battery room, and non-1E switchgear room. The fans have controllable pitch blades so that SR ventilation airflow can account for changes in outside air temperature. Fans F10 and F12 are normally in a standby condition and start automatically during a safety injection actuation signal (SIAS) or under voltage (UV) condition on the 11 4 kV bus. Fans F-10 and F-12 are tested monthly during the performance of STP-O-008A-1.

Constellation determined that on May 27, 2010, instrument and control technicians incorrectly calibrated 1TIC10541 by selecting the incorrect output calibration input in the Vendor Technical Manual, "VTD 15665-841-1027." Specifically, VTD-15665-841-1027, requires selection of the 4-20 milliamp direct setting. Instrument and control personnel improperly selected the 4-20 milliamp reverse setting which caused the controller to operate in the opposite direction. The result was that a full demand signal would yield a minimum output signal from the controller and consequently, portions of the SR ventilation would experience a low flow condition.

During review of the apparent cause evaluation, inspectors identified that three different instrument and control groups worked on the reprogram and calibration of 1TIC10541. The first two instrument and control groups were unable to complete the work with the guidance provided in the WO. The third instrument and control group completed the WO with assistance from the system manager. The apparent cause evaluation also

concluded that the related WO did not specify or require post maintenance testing (PMT) and therefore the WO was completed without performing PMT.

Constellation performed DE10600, "Evaluation of Loss of 1A DG Building SR Ventilation System on the 1A DG Operability," to determine if the 1A DG would have been able to perform its safety function during the period from May 27, 2010, until September 15, 2010. Using a GOTHIC computer model, Constellation determined that the 1A DG maintained its ability to perform its safety function during the period in question.

Analysis: The performance deficiency is that Constellation failed to perform maintenance on SR equipment in accordance with written procedures. This finding is more than minor because it was associated with the Mitigating Systems cornerstone attribute of human performance and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incorrect calibration of 1TIC10541 prevented the 1A DG SR ventilation system from fulfilling its design function and caused reasonable doubt whether the 1A DG could fulfill its safety function. The inspectors evaluated this finding using IMC 0609 Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a. The inspectors determined that the finding was of very low safety significance (Green) because the issue was a design or qualification deficiency confirmed not to result in loss of operability or availability of the 1A DG. The finding has a cross-cutting aspect in the area of human performance, work practices, because Constellation did not ensure that personnel do not proceed in the face of uncertainty or unexpected circumstances (H.4.a of IMC 0310).

Enforcement. TS 5.4.1.a, "Procedures," states, in part, that written procedures shall be established, implemented, and maintained for activities described in Appendix A of Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. Specifically, Section 9 of RG 1.33, Appendix A, states, "Maintenance that can affect the performance of SR equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances." Contrary to the above, on May 27, 2010, instrument and control personnel did not correctly implement the calibration procedure on page 5-12 of VTD-15665-841-1027 and selected the wrong output calibration input. As a result, a full demand signal would yield a minimum output signal from the controller resulting in a low flow condition in portions of the SR ventilation system for the 1A DG. Immediate corrective actions included declaring the 1A DG inoperable until the temperature controller was correctly calibrated and tested. Because this violation is of very low safety significance and Constellation entered the issue into their CAP (CR-2010-010865), this issue is being treated as an NCV consistent with Section 2.3.2 of the NRC's Enforcement Policy. **(NCV 05000317/20005-02: Failure to Follow Written Procedures During Calibration of 1A DG SR Ventilation Temperature Controller)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – Two Samples)

a. Inspection Scope

The inspectors reviewed the following activities to verify that Constellation performed the appropriate risk assessments for planned maintenance of OOS equipment and emergent work. For the emergent work activities performed by station personnel, the inspectors verified that Constellation promptly reassessed and managed the plant risk.

The inspectors compared the risk assessments and risk management actions with CNG-OP.4.01-1000, "Integrated Risk Management," and Constellation's risk assessment tool to the requirements of 10 CFR Part 50.65(a)(4) and the recommendations of the Nuclear Management and Resources Council 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." In addition, the inspectors assessed the adequacy of Constellation's identification and resolution of problems associated with maintenance risk assessments and emergent work activities.

- Unit 2 emergent risk assessment associated with secondary plant equipment issues while 0C DG was OOS for maintenance on November 2, 2010; and
- Planned maintenance associated with P-13000-113 kV transformer OOS on November 15, 2010.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 – Five Samples)

a. Inspection Scope

The inspectors reviewed operability evaluations and/or CRs to verify that the identified conditions did not adversely affect safety system operability or plant safety. The evaluations were reviewed using criteria specified in NRC Regulatory Issue Summary 2005-20, "Revision to Guidance formerly contained in NRC Generic Letter 91-18, Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," and IMC Part 9900, "Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety." In addition, where a component was inoperable, the inspectors verified the TS limiting condition for operation implications were properly addressed. The inspectors performed field walkdowns, interviewed personnel, and reviewed the following items:

- 0C DG battery charger No. 17 failed (CR-2010-007789);
- 1B DG failed to rotate on compressed air (CR-2010-011140);
- 1A DG SR cables were found submerged in 1MH21 (CR-2010-010865);
- 1B DG overcrank timing relay set point drift (CR-2010-011140); and
- 2-SI-306 inadvertently mispositioned during maintenance on 2-SI-657 (CR-2010-012257).

b. Findings

Introduction: The inspectors identified a finding of very low significance (Green) because Constellation did not conduct an adequate functionality review following failure of the 0C DG battery charger.

Description: On July 23, 2010, the inspectors followed up on an issue that was thought at the time to be a failure of the 0C diesel battery charger No. 17. The 0C diesel is important to the Station Blackout Rule (SBO) rule (10 CFR Part 50.63), safe shutdown following a station fire (10 CFR Part 50, Appendix R), and loss of offsite power

scenarios. The inspectors questioned the basis of the minimum battery voltage of 111 VDC used to justify 0C diesel functionality. The inspectors reviewed OI-26A, "125 VDC System," and noted that the basis of the 111 VDC was "manufacturer's warranty limits." Constellation initiated CR-2010-009149 to further evaluate the required minimum battery voltage. Meanwhile, based on a preliminary analysis, Constellation placed a note in the operator's turnover sheet to direct operators to declare the 0C diesel unavailable if its associated battery charger is OOS and the battery is at 117 VDC. On August 30, 2010, battery charger No. 17 for the 0C diesel experienced an actual failure. The minimum battery voltage reached during the battery charger failure was 122 VDC. Operations initiated CR-2010-009247 and stated that the 0C diesel retained its functionality as long as the minimum battery voltage remained above 117 VDC per the note in the operator's turnover sheet. The inspectors reviewed the preliminary analysis and concluded that the preliminary analysis did not take into account the Appendix R mission time (72 hours). The preliminary analysis only took into account the SBO rule mission time of four hours. After further analysis and review, Constellation determined that the 0C diesel was not capable of supporting its Appendix R function for the required mission time with the battery charger OOS. Constellation determined that the 0C diesel should have been declared unavailable on August 30, 2010.

CNG-CA-1.01-1000, "Corrective Action Program," Section 5.3, "Operations Review of Operability/Reportability," required that functionality reviews be conducted so that appropriate actions are taken. The inspectors concluded that the functionality review on August 30, 2010, was inadequate because Constellation failed to recognize that the 0C diesel was unavailable and failed to take appropriate actions. These actions would have included conducting a risk assessment in accordance with CNG-OP-4.01-2000, "Integrated Risk Management," and entering SA-1-100, "Fire Protection/Appendix R Compensatory Actions," for impaired Appendix R equipment. The inspectors noted that the battery charger was OOS for approximately 16 hours on August 30, 2010, with no actions taken.

Immediate CAs included instructions to operators to declare the 0C diesel not available any time its associated battery charger is taken OOS. Additional CAs planned include changing OI-26A, "125 VDC System," to reflect that the battery charger is required to support the 0C diesel functionality.

Analysis: The performance deficiency is that Constellation did not conduct an adequate functionality review following the failure of the 0C DG battery charger. The finding is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Constellation did not recognize that the 0C diesel was not available for its Appendix R function with its associated battery charger OOS. Using IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," Table 3b, the finding affected the fire protection defense-in-depth strategy involving post fire safe shutdown systems. Therefore, Table 3b requires additional evaluation using IMC 0609, Appendix F, "Fire Protection Significance Determination Process." IMC 0609, Appendix F, Step 1.2, requires the inspector to assign a degradation rating that reflects the severity of the deficiency. The inspectors assigned a degradation rating of moderate based on the 0C diesel generator ability to provide some substantial defense in depth benefit despite the noted deficiency. Based on Constellation analysis, the 0C diesel could have operated loaded for approximately

21 hours with the battery charger OOS and the battery voltage at 122 VDC. In accordance with IMC 0609, Appendix F, Step 1.3, the finding screens to very low safety significance (Green) based on the finding only affected the ability to reach and maintain cold shutdown conditions. The finding also has a cross-cutting aspect in the area of human performance, resources, because Constellation did not ensure complete, accurate, and up-to-date procedures (OI-26A) were available and adequate to assure nuclear safety (H.2.c of IMC 0310).

Enforcement: This finding does not involve enforcement action because no regulatory violation was identified. Because this finding does not involve a violation of regulatory requirements and has a very low safety significance, it is identified as a finding (FIN). The issue has been entered into Constellation's CAP as CR-2010-009149. **(FIN 05000317/318/2010005-03: Inadequate Functionality Review of 0C Diesel Degraded Condition)**

1R19 Post-Maintenance Testing (71111.19 – Four Samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- 1B DG jacket cooling water leak repair (WO #C91045198);
- Repair leak on 22A SI tank header isolation valve (WO #C91040826);
- Swap controls between 2-CV-52-8 and 2-CV-5163 (WO #C91001458); and
- Calibrate 2-I/P-306 for 2-SI-306 (WO #C91086841).

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – Three Samples)

a. Inspection Scope

The inspectors observed and/or reviewed the surveillance tests listed below associated with selected risk-significant SSCs to determine whether the testing adequately demonstrated the ability to perform its intended safety function. The inspectors also verified that proper test conditions were established as specified in the procedures, no equipment preconditioning activities occurred, and that acceptance criteria had been satisfied.

- Test of 1A DG and 11 4 kV bus LOCI sequencer (STP-O-008A-1);
- Containment liner inspection (STP-M-665-1); and
- SI system valve quarterly operability test (STP-O-65Q-2).

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

### Cornerstone: Occupational/Public Radiation Safety

2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01 – One Sample)

a. Inspection Scope

During the period December 6, 2010, through December 10, 2010, the inspectors conducted the following activities to verify that Constellation properly assessed the radiological hazards in the workplace and implemented appropriate radiation monitoring and exposure controls during routine operations. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, relevant TS, and the licensee's procedures. The inspectors reviewed radiation protection program self-assessments and audits.

Radiological Hazard Assessment

- The inspectors walked down the facility, including the auxiliary building, to evaluate material and radiological conditions. With the assistance of a radiation protection technician, the integrity of several locked high radiation areas (LHRA) was challenged. The inspectors verified the postings of the LHRA.
- The inspectors reviewed pre-work and in-progress surveys for refurbishment of nozzle dams, manway stud tensioners in the material processing facility and new fuel receipt in the fuel handling area of the auxiliary building.
- The inspectors verified that the lapel air samples obtained for the refurbishment of the nozzle dams were collected and analyzed in accordance with licensee procedures.

Instructions to Workers

- The inspectors verified that Constellation has established a means to inform workers of changes that could significantly impact their occupational dose.

Contamination and Radioactive Material Control

- The inspectors reviewed Constellation's procedure for the survey and release of material and verified it is sufficient to control the spread of contamination and prevent the unintended release of radioactive materials from the site.
- The inspectors observed the surveys of material at the radiologically controlled area's (RCA's) exit point and the Material Processing Facility's exit point. The

inspectors verified that the surveys and actions taken in response to alarms were in accordance with the Constellation procedures.

Problem Identification and Resolution

- The inspectors reviewed Constellation's self-assessments, audits, and special reports related to the radiation protection program to determine if identified problems were entered into the CAP. The inspectors verified that problems identified were entered into the CAP and appropriate corrective actions were identified.

b. Findings

Introduction: The inspectors identified a very low safety significance (Green) NCV of TS 5.4.1.a, "Procedures," involving Constellation's failure to implement procedures to calibrate and maintain ventilation and radiation effluent monitoring equipment.

Description: On December 9, 2010, refurbishment of the SG nozzle dams and manway stud tensioners was in progress in the material processing facility. At that time, only one exhaust train of the ventilation system was in operation. The design criterion for the material processing facility requires that the ventilation system provide approximately one half inch of negative pressure in the processing room, the decontamination facility, and in the laundry room. Additionally, the exhaust ventilation is required to be monitored. The inspectors identified that one exhaust unit has been OOS for eight months, the supply fan, air handling unit (AHU)-1, has been OOS for seven years, and the radiation monitor has been OOS for most of the last four years. The operating procedure for the material processing facility, RSP 2-400, "General Guidelines for Materials Processing Facility Operation," requires that, "A negative pressure (of approximately one-half inch of water) is maintained in the processing area with other air exhaust units (AEU 1&2), one air handling unit (AHU-1) operating and all exterior doors closed." Even though this requirement is in the procedure, the procedure was changed to allow operation of the facility with only one exhaust fan running.

Both the design criteria and the safety evaluation (SE) require the air exhaust system to be monitored for radiation before discharge to the outside environment. Each exhaust train of the material processing facility has an isokinetic nozzle that is commonly connected prior to the radiation monitor. With only one train of exhaust running, the isokinetic nozzle of the OOS exhaust fan provides a dilution flow to the radiation monitor making the sample non-representative. A change was made to the operating procedure to allow a sampler to be connected to the monitor to take a grab sample when the monitor was OOS. This change not only allowed dilution flow from the OOS exhaust train, but also allowed dilution flow through a bypass pipe on the monitor sample pump.

Analysis: The inspectors determined that Calvert Cliffs' failure to implement procedures to calibrate and maintain ventilation and radiation effluent monitoring equipment, constituted a performance deficiency. Specifically, the one-half inch of water negative pressure and representative monitoring was not maintained as required by RSP 2-400 with only one train of exhaust ventilation in operation and sampling of the exhaust with dilution flow. Representative monitoring was also inhibited by additional dilution flow when a grab sampler was connected to the monitor. The equipment as specified in the design criteria was not maintained for years and to keep the facility in operation, procedure changes were made to compensate for the lack of equipment repair. The

failed ventilation and radiation monitoring instrumentation would not have performed its safety function within a reasonable safety margin to establish ventilation controls and to identify an effluent release. The finding was more than minor because the failure to maintain the ventilation and radiation monitoring equipment affects the Radiation Protection cornerstone to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. The inspectors evaluated this finding using IMC 609, Appendix D, Section I, Radioactive Effluent Release Program. The inspectors determined that the finding is of very low safety significance (Green) because it did not impair Calvert Cliffs' ability to assess dose. Calvert Cliffs did assess dose and the limits of 10 CFR 50 Appendix I and 10 CFR 20.1301(e) were not exceeded. The finding also has a cross-cutting aspect in the area of problem identification and resolution, corrective action, because appropriate corrective actions were not taken in a timely manner. The exhaust fan was OOS for eight months, the supply fan was OOS for seven years, and the radiation monitor was OOS for most of four years (P.1.d or IMC 0310).

Enforcement: TS 5.1.4.a, "Procedures," requires procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978 lists in section 7.c.4 Ventilation Air Monitoring. The operating procedure for the material processing facility, RSP 2-400, requires a negative pressure (of approximately one-half inch of water) be maintained in the processing area with other air exhaust units (AEU 1&2), one air handling unit (AHU-1) operating and all exterior doors closed. Contrary to the above, on December 9, 2010, a negative pressure (of approximately one-half inch of water) was not maintained in the processing area, while refurbishment work was ongoing. Immediate corrective actions included stopping all work in the building and completing the necessary repairs before restarting activities. Because this violation was of very low safety significance and Constellation entered the issue into their CAP, this violation is being treated as a NCV, consistent with the Enforcement Policy. **(NCV 05000317/318/2010005-04: Failure to Implement Procedures to Calibrate and Maintain Ventilation and Radiation Effluent Monitoring Equipment)**

2RS02 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls (71124.02)

a. Inspection Scope

During the period December 6, 2010, through December 10, 2010, the inspectors conducted the following activities to verify that Constellation was properly implementing operational, engineering, and administrative controls to maintain personnel exposure ALARA. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and procedures.

Source Term Reduction and Control

- The inspectors reviewed the minutes of the Source Term Reduction Team, surveys, and interviewed the ALARA supervisor. The inspectors reviewed the dose reduction efforts in the auxiliary building five foot elevation. Constellation identified that the Unit 1 and Unit 2 degasifier filters were removed in an effort to reduce radioactive

waste generation; however, over time an increase in dose rates resulted. New filters were installed and the dose rates immediately decreased.

b. Findings

No findings were identified.

2RS08 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

a. Inspection Scope

During the period October 12, 2010, through October 14, 2010, the inspectors conducted the following activities to verify the effectiveness of Constellation's programs for handling, packaging, and transportation of radioactive material.

Shipment Preparation

- The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, and shipping papers provided to the driver and Constellation's verification of shipment readiness. The inspectors verified that the requirements of the cask certificate of compliance were met and the emergency phone number provided to the driver was operational.
- The inspectors observed workers during the conduct of radioactive material shipment preparation activities. The inspectors interviewed radiation workers to determine if they were knowledgeable of the shipping regulations and whether shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport.

b. Findings

No findings were identified.

## 4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator (PI) Verification (71151 – Twelve Samples)

.1 Mitigating Systems

a. Inspection Scope

The inspectors reviewed Constellation's PI program for Units 1 and 2 to evaluate, collect and report information on Mitigating Systems Performance Index (MSPI). The MSPI systems were reviewed for the period of July 2009 through September 2010. The inspectors used the guidance provided in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," to assess the accuracy of PI data collected and reported. The inspectors reviewed system unavailability data, monitored component demands, demand failure data, and the consolidated data entry MSPI derivation reports for both unavailability index and unreliability index. Additionally, the inspectors reviewed the equipment OOS logs, operating logs, and the maintenance

rule database (MRule Manager) to determine the accuracy and completeness of the reported unavailability data.

- High pressure injection system;
- Emergency alternate current (AC) power system;
- Low-pressure safety injection (LPSI);
- Cooling water systems; and
- Auxiliary feedwater (AFW).

b. Findings

No findings were identified.

.2 RETS/ODCM Radiological Effluent Occurrences

a. Inspection Scope

The inspectors reviewed relevant effluent release reports for the period April 1, 2010, through June 30, 2010, for issues related to the public radiation safety PI which measures radiological effluent release occurrences that exceed 1.5 millirem/quarter whole body or 5.0 millirem/quarter organ dose for liquid effluents; 5 millirads/quarter gamma air dose, 10 millirads/quarter beta air dose, and 7.5 millirads/quarter for organ dose for gaseous effluents.

b. Findings

No findings were identified.

.3 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors reviewed implementation of the Constellation's Occupational Exposure Control Effectiveness PI Program. Specifically, the inspectors reviewed recent CRs, and associated documents, for occurrences involving LHRAs, very high radiation areas, and unplanned exposures against the criteria specified in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify that all occurrences that met the NEI criteria were identified and reported as PIs.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – Four Samples)

.1 Reviews of Items Entered Into the CAP

a. Inspection Scope

The inspectors performed a daily screening, as required by IP 71152, "Identification and Resolution of Problems," of items entered into Constellation's CAP. The review facilitated the identification of potentially repetitive equipment failures or specific human performance issues for follow-up inspection. The inspectors reviewed the description of each new CR and attended screening meetings.

b. Findings

No findings were identified.

. 2 Annual Sample: Unit 2 Power-Operated Relief Valve (PORV) Closing Time Outside of Acceptance Criteria

a. Inspection Scope

CR-2009-1276 documented an instance where one of the Unit 2 PORVs exceeded its closing time criteria. The inspectors reviewed the appropriateness of the assigned significance, the scope and depth of the apparent cause analysis, and the timeliness of resolution. The inspectors assessed whether the evaluation identified likely causes for the issues and identified appropriate CAs. The inspectors assessed whether Constellation's evaluations considered extent of condition, generic implications, common cause, and previous occurrences. The inspectors reviewed the potential impact on nuclear safety and risk to verify that Constellation had taken appropriate CAs commensurate with the significance of the issue.

b. Findings

Introduction: The inspectors identified an unresolved item (URI) associated with the failure to perform inservice testing (IST) for the pressurizer PORVs in accordance with American Society of Mechanical Engineers (ASME) Code for the Operation and Maintenance of Nuclear Power Plants.

Description: In 2000, Constellation changed the preventive maintenance requirement for the PORVs at both units such that rather than being removed and overhauled every six years, the valves were removed and overhauled every cycle (every two years). In 2004, Constellation began to functionally test the PORVs to meet their TS and IST surveillance requirements at the end of a unit's operating cycle in accordance with procedure STP-M-673, "PORV Response Time Test." This testing was performed on valves which were subsequently replaced by refurbished spares. This was done to reduce the number of actuations the inservice valves were subjected to at a pressure below the normal operating pressure. OE indicated that by testing the PORVs at the lower pressures prescribed by STP-M-673, the potential for seat leakage was increased due to insufficient pressure to fully reseat the main valve disc.

The Inspectors' review of this practice identified that testing established in 2004 was not a proper interpretation of the requirements of the ASME Code. Specifically, ISTC-3310 requires a valve to be stroke time tested to verify that the reference value was still valid, or to set a new reference value following any maintenance which could affect the performance of the valve. The mounting of the solenoid and the setting of the plunger on site may affect the performance of the PORV being installed. IST runs were not performed following replacement of both valves during refueling outages since 2004 for both units (1-ERV-402, 1-ERV-404, 2-ERV-402, and 2-ERV-404) to verify or reestablish the valves' reference values.

In response to this inspector-identified concern, Constellation initiated CR-2010-011886. This item is unresolved pending inspector review of Constellation's completed evaluation and CAs for this issue, and a determination if the performance deficiency associated with this issue is more than minor. **(URI 05000317/318/2010005-05, Failure to Perform Testing of PORVs in Accordance with ASME Code)**

. 3 Annual Sample: Review of Past and Current Performance of Operators in Classifying Emergency Events.

a. Inspection Scope

This inspection focused on Constellation's problem identification, evaluation and resolution concerning the performance of operators when classifying emergency events. Specifically, the inspectors selected condition report (CR) 2009-001158 as a sample for detailed follow-up review. CR-2009-001158 documented that licensed operator requalification training (LORT) did not meet Calvert Cliffs' internal Emergency Action Level (EAL) classification performance indicator target of 97%. The indicator measures the percentage of timely and accurate EAL classifications during evaluated simulator sessions. The CR referenced the 2008 simulator sessions where 120 of 125 (96%) classification opportunities were classified accurately.

The inspectors reviewed Constellation's CRs, related apparent cause evaluations (ACEs), and corrective actions associated with operator performance in classifying emergency events timely and accurately. The inspectors interviewed Calvert Cliffs Emergency Preparedness staff responsible for oversight of the drill and exercise performance indicator data, reviewed the corrective action procedure, and completed a walkdown of the simulated control room. This review was completed to evaluate the effectiveness of Constellation's corrective actions.

b. Findings

No findings were identified.

As a result of CR-2009-001158, an ACE was completed. The ACE determined that the missed opportunities were due to inadequate self-verification practices while completing notification forms, inadequate peer check of notification forms during Shift Technical Advisor review, and a technical knowledge gap. CAs included training on EAL classifications, remediation plans for inaccurate classifications during LORT, and briefing shift managers on the importance of making accurate and timely EAL classifications. Constellation determined that the CAs introduced in the ACE had been effective in the short term; however, had not been sustainable in the long term.

In response, CR-2009-006517 was generated to address the inconsistent performance of operators in completing timely and accurate EAL classifications. A second ACE identified seven apparent causes and introduced a number of robust corrective actions which included developing and implementing Standing Order 09-08 – EAL Classification Improvement Protocol, implementing a job aid to help with EAL classifications, and establishing an EAL review board. The inspectors determined that the corrective actions implemented were effective in improving operator performance in the training environment. However, the same improvement has not been noted when classifying actual events. The inspectors noted that since 2009 Constellation has misclassified or failed to recognize plant conditions requiring emergency classification for at least two actual events.

To address these deficiencies, additional corrective actions planned include evaluating current LORT scenarios and developing mini-scenarios to provide training opportunities on EALs that are infrequently or never used. The inspector concluded that these additional CAs are reasonable.

.4 Semi-Annual Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues to identify trends that might indicate the existence of more significant safety issues, as required by Inspection Procedure (IP) 71152, "Identification and Resolution of Problems." The inspectors included in this review, repetitive or closely-related issues that may have been documented by Constellation outside of the CAP, such as trend reports, PIs, system health reports, and quality assurance (QA) assessments. The inspectors also reviewed the Constellation CAP database to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRC's daily CR review (Section 4OA2.1). The inspectors reviewed Constellation's quarterly trend report for the third quarter of 2010 for selected departments to verify that Constellation personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

In general, the licensee identified trends and appropriately addressed the trends within their CAP. However, the inspectors noted an adverse trend in the number of issues associated with radiation monitors. Although Constellation had previously recognized this issue and designated radiation monitors as one of the site's "Top 10" material issues, the inspectors noted a more recent decline in radiation monitoring system health. This decline in system health has been due to the lack of maintenance support, rescheduled projects, project funding considerations, and failures due to obsolescent equipment. The inspectors noted that Constellation established a long-term plan to replace aging radiation monitors and established compensatory actions for radiation monitors that are OOS.

4OA5 Other Activities

.1 Independent Spent Fuel Storage Installation (ISFSI) (60855, 60855.1 – One Sample)

a. Inspection Scope

The inspectors observed activities associated with the loading of a dry cask canister to ensure that TSs were met, equipment operated properly, and personnel were properly trained. The inspectors reviewed documents and records associated with the operation of the ISFSI. The inspectors met with reactor engineering personnel to review the fuel selection process and associated documentation. The video recording of the fuel assemblies placed into the canister was reviewed to ensure that each fuel assembly was placed into the proper location. The inspectors observed work activities on the refuel floor associated with the fuel selection and loading of fuel assemblies into the cask. The inspectors observed the placement of the automated welding system onto the cask and the subsequent welding of the cask lid and dye penetrant examination of the weld. The inspectors also observed the setup and operation of the of the vacuum drying system.

b. Findings

No findings were identified.

.2 NRC Temporary Instruction (TI) 2515/179

a. Inspection Scope

During the period December 6, 2010, through December 10, 2010, the inspectors conducted the following activities to confirm that inventories of materials possessed by Constellation were appropriately reported and documented in the National Source Tracking System (NSTS) in accordance with 10 CFR 20.2207. This inspection activity completes the requirements for closeout of this temporary instruction.

Inventory Verification

- The inspectors obtained a copy of the Constellation NSTS inventory for comparison and performed a physical inventory at the site. The inspectors verified the information listed on Calvert Cliffs inventory record.

Determine the Location of Unaccounted-for Nationally tracked sources

- The inspectors verified there were no unaccounted for sources.

Review of Other Administrative Information

- The inspectors reviewed the administrative information with Constellation personnel to ensure that the information was up to date.

b. Findings

No findings were identified.

.3 Independent Spent Fuel Storage Installation (ISFSI) Radiological Control Activities

a. Inspection Scope

The inspectors evaluated the effectiveness of controlling radiological activities at the ISFSI. The inspectors reviewed the ALARA review and radiological work permit (RWP) used for ISFSI activities, and walked down the ISFSI area. The condition of the radiological postings was verified by the inspectors. The inspectors reviewed surveys from the most recent transfer of a cask to the ISFSI.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 14, 2011, the resident inspectors presented the inspection results to Mr. George H. Gellrich and other members of the Constellation staff who acknowledged the findings. The licensee did not indicate that any of the information presented at the exit meeting was proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

# SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Constellation Personnel

G. Gellrich, Site Vice President
T. Trepanier, Plant General Manager
R. Cable, Radiation Protection Technician
R. Courtney, Radiation Protection Supervisor
B, Dansberger, Radiation Protection Supervisor
J. DeSando, Director, Fleet ISFSI
J. Herron, Supervisor, Engineering
M. Hillebrand, Supervisor, Mechanical Maintenance
L. Kovacina, Radiation Protection Technician
R. Lopez, Radiation Protection Technician
D. Lauver, Director, Licensing
S. Loeper, Principal Engineer
J. Pruitt, Radiation Protection Technician
L. Richards, General Supervisor, Maintenance Support
D. Scroggy, Radiation Protection Technician
M. Shubert, Senior Engineer
D, Svendsgaard, Radiation Protection Technician
M. Thompson, Radiation Protection Technician
C. Thomas, Engineer
J. Wood, Auxiliary Operator-Nuclear
J. Wynn, Principal Engineer

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000317/318/2010005-05 | URI | Failure to Perform Testing of PORVs in Accordance with ASME OM Code (Section 4OA2) |

Opened and Closed

| | | |
|---|---|---|
| 05000317/318/2010005-01 | NCV | Inadequate Corrective Actions Associated with Submerged SR Cables (Section 1R06) |
| 05000317/2010005-02 | NCV | Failure to Follow Written Procedures During Calibration of the 1A DG SR Ventilation Temperature Controller (Section 1R12) |
| 05000317/318/2010005-03 | FIN | Inadequate Functionality Review of 0C Diesel Degraded Condition (Section 1R15) |

| | | |
|---|---|---|
| 05000317/318/2010005-04 | NCV | Inadequate Corrective Action to Address Equipment Repairs in the Material Processing Facility (Section 2RS01) |

## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

Procedures
NO-1-119, Seasonal Readiness, Revision 00500
OI-22J, 125 VDC Battery Room Ventilation, Revision 00500

Drawings
60717SH0001, Well Water, Pretreated Water, Demineralized Water, and Condensate Storage System, Revision 98

Condition Reports
CR-2010-011084
CR-2010-000040

Miscellaneous
OAP 92-9, Cold Weather Operations, Revision 7

### Section 1R04: Equipment Alignment

Procedures
OI-03A-2, Safety Injection and Containment Spray, Revision 02505
OI-27B, 13.8 KV System, Revision 01801

Condition Reports
CR-2010-010833

Miscellaneous
MCR 94-052-016-00

Drawings
12320SH0012, 6 in Forged Bolted Bonnet Swing Check Valve, Revision 24

### Section 1R05: Fire Protection

Miscellaneous
FP-0002, Fire Hazards Analysis Summary Document, Revision 0
SA-1-100, Fire Prevention, Revision 16
UFSAR, Section 9.9, Calvert Cliffs Power Plant Fire Protection Program, Revision 39
FFSM-10A100, Fire Fighting Strategies Manual -10 Elevation Auxiliary Building, Revision 1

## Section 1R06: Flood Protection Measures

Procedures
CNG-AM-1.01-1029, Medium Voltage Cable Program, Revision 0000

Condition Reports

| | | | |
|---|---|---|---|
| CR-2010-011478 | CR-2010-010865 | CR-2010-010351 | CR-2009-006011 |
| CR-2010-011479 | CR-2010-010866 | CR-2010-004974 | CR-2009-005375 |
| CR-2010-011048 | CR-2010-010867 | CR-2010-001543 | CR-2009-005672 |
| CR-2010-011027 | CR-2010-010868 | CR-2009-008346 | IRE-031-858 |
| CR-2010-011025 | CR-2010-010672 | CR-2009-006044 | |

Drawings
63874SH0001, Underground Conduit West of Turbine Building Plan, Revision 3
63874SH0002, Diesel Generator Project SR & SBO Manholes and Ductbank Plans, Sections & Details, Revision 2
63874SH0005, Underground Conduit West of Turbine Building Plan, Revision 0
61815SH0001, Yard Electrical Manholes, Revision 5
61815SH0004, S.R. Ductbank Under West Plant Road Plan Sections & Details, Revision 0
61815SH0007, Yard Electrical Manholes, Revision 0
61815SH0008, Yard Electrical Manholes, Revision 0
61815SH0009, Yard Electrical Manholes, Revision 0
61815SH0011, Yard Electrical Manholes, Revision 0
61523SH0001, Yard Piping Plan Sheet No. 1, Revision 36
61523SH0002, Yard Piping Plan Sheet No. 2, Revision 0

Miscellaneous
Constellation Generic Letter 2007-01 Response, dated 7 May, 2007
ES-001, Flooding, Revision 02
EPM 10121, Revision 0
EPM 10120, Revision 2
EPRI TR 103834-P1-2, Effects of Moisture on the Life of Power Plant Cables, Part 1: Medium Voltage Cables
NRC Information Notice 2002-12
NRC Generic Letter 2007-01
UFSAR, Section 9.5, Flooding Due to a Passive Failure, Revision 34

Work Orders

| | | | |
|---|---|---|---|
| WO #C12008392 | WO #C120015109 | WO #C120040042 | WO #C120054068 |
| WO #C20090503 | WO #C120030038 | WO #C120065634 | WO #C120074003 |
| WO #C91038024 | WO #C90113655 | WO #C91039948 | |

## Section 1RO7: Heat Sink Performance

Procedures
EN-1-327, Service Water Reliability Program, Revision 4
OI-16-2, Component Cooling, Revision 02901

Miscellaneous
Service Water Heat Exchanger Health Status Report from 10/29/10
Service Water Heat Exchanger Health Status Report from 11/5/10
Service Water Heat Exchanger Health Status Report from 11/12/10

**Section 1R11: Licensed Operator Requalification Program**

Procedures
AOP-3G-1, Malfunction of Main Feedwater System, Revision 01200
EOP-0-1, Post-Trip Immediate Actions, Revision 01100
EOP-3-1, Total Loss of All Feedwater, Revision 01802

Miscellaneous
OP-24, Simulator Operating Examination for the Licensed Operator Training Program, Revision 7

**Section 1R12: Maintenance Effectiveness**

Procedures
CNG-AM-1-.01-1023, Maintenance Rule Program, Revision 00100
STP-O-8B-1, Test of 1B Diesel Generator and 14 4 Kilovolt Bus Loss-of-Coolant-Incident Sequencer, Revision 27
OI-21B-1, 1B Diesel Generator, Revision 01802
OI-22M, 1A and 0C Building HVAC, Revision 7

Condition Reports
CR-2010-008493
CR-2010-009891
CR-2010-008503
CR-2010-008714

Drawings
62429SH0001, HVAC Systems, Revision 5
61085SH0077, Schematic Diagram Diesel Generator 1A Building Supply Fan F-10, Revision 0

Miscellaneous
CNG-CA-1.01-1005 Apparent Cause Evaluation for CR-2010-009891
DE106000, Evaluation of Loss of 1A DG Building SR Ventilation System on the 1A DG Operability, Revision 0
MCDS-1TIC-10541, Master Calibration Data Sheet for 1-TIC-10541
VTD 15665-841-1027, Section 5 VOL 3 Honeywell UDC5000 Ultra-Pro Universal Digital Controller Product Manual Number 51-51-17C Calibration

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures
Maintenance Rule Risk Assessment Guideline, Revision 7
CNG-OP-4.01-1000, Integrated Risk Management, Revision 00601

Drawings
61001SH0001, Electrical Main Single Line Diagram FSAR Figure 8-1, Revision 42

**Section 1R15: Operability Evaluations**

Procedures
CNG-OP-1.01-1002, Conduct of Operability Determinations/Functionality Assessments, Revision 00101
CNG-CA-1.01-1000, Corrective Action Program, Revision 00400
OI-21B-1, 1B Diesel Generator, Revision 02000
OI-26A, 125 Volt Vital DC, Revision 15

Condition Reports
CR-2010-011140
CR-2010-010865
CR-2010-009247
CR-2010-009149
CR-2010-007873
CR-2010-007789

**Section 1R19: Post-Maintenance Testing**

Procedures
OI-16-2, Component Cooling System, Revision 02901

Condition Reports
CR-2010-012316
CR-2010-012257
CR-2010-011673
CR-2010-011098
CR-2010-010883

Work Orders
WO #C91045198
WO #C91040826
WO #C91001458
WO #C91086841

Miscellaneous
ECP-10-000715
ECP-10-000886
ES200800238

**Section 1R22: Surveillance Testing**

Procedures
STP-O-008A-1, Test of 1A DG and 11 4kV Bus LOCI Sequencer, Revision 27
STP-M-665-1, Containment Visual Inspection, Revision 0600
STP-O-65Q-2, Safety Injection System Valve Quarterly Operability Test, Revision 00406

**Section 2RS01: Radiological Hazard Assessment and Exposure Controls**

Procedures:
RSP 1-104, Area Posting and Barricading, Revision 02300

RSP 1-113, Release of Items, Material and Vehicles from a Contaminated or Radiologically Controlled Area, Revision 01000
RSP 1-115, Radiological Air Sampling Program, Revision 01100
RPPG-01-024, Issuing High Radiation Keys, Revision 0
NO-1-110, Calvert Cliffs Key and Lock Control, Revision 00801

Condition Reports:

| | | | |
|---|---|---|---|
| CR-2010-010795 | CR-2010-005764 | CR-2010-004011 | CR-2010-001505 |
| CR-2010-010785 | CR-2010-004837 | CR-2010-003914 | |
| CR-2010-010166 | CR-2010-004892 | CR-2010-002287 | |
| CR-2010-009652 | CR-2010-004842 | CR-2010-001987 | |
| CR-2010-008701 | CR-2010-004831 | CR-2010-001652 | |

Audits and Assessments:
QPA Assessment Reports
2010-041, Review of Cat 1 & @ CRs Assigned to the Performance Improvement Unit and Radiation Protection
2010-049 (CAP) Closure Quality
2010-052 Radiation Protection Technician Technical Performance
2010-056 Waste Resin Shipment
2010-064 Fleet Type II – CCNP Refuel Outage Collective Radiation Exposure
2010-078 CCNPP Radiation Protection Technical Training Program
2010-090 CCNPP Work Order Planning

Calvert Cliffs Primary Chemistry Monthly Self-Assessments
February 3/29/2010
May 6/28/2010
September10/22/2010

Air Samples Reviewed

| Sampler Serial No. | Off Time |
|---|---|
| 7818 | 12/7/2010 @ 0627 |
| 7819 | 12/7/2010 @ 0632 |
| 5166 | 12/7/2010 @ 0900 |

Surveys Reviewed

| | |
|---|---|
| 69' Aux/SFP | 6/30/2010 |
| 27' Aux | 4/23/2010 |
| U2 Charging Pump Room | 10/4/2010 |
| 5' U 2 Aux | 8/24/2010 |
| 5' U 1 Aux | 8/24/2010 |
| 69' Aux U2 Containment Access Area | 6/15/2010 |
| 45' Aux Truck Loading Area | 11/2/2010 |
| 45' Aux Solid Waste Processing | 10/13/2010 |
| 45' Aux U-1 Blow Down | 5/3/2010 |

**Section 2RS02: Occupational ALARA Planning and Controls**

Procedures:
RP-1-101, ALARA, Revision 5
RSP 1-200, ALARA Planning and RWP Preparation, Revision 02401

Condition Reports:
CR-2010-001752
CR-2010-001832
CR-2010-002662
CR-2010-002749
CR-2010-003976

**Station ALARA Committee Minutes:**
June 7, 2010
June 25, 2010
August 11, 2010
October 28, 2010
November 10, 2010

**Section 2RS08: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage and Transportation**

Procedures
CP-616, Shipment of Radioactive Materials Definitions, Revision 0
CP-617, Shipment of Radioactive Materials General Requirements, Revision 0
CP-618, Packaging for Shipment or Transportation of Radioactive Materials, Revision 00102
CP-619, Radioactive material Quantification Identification and Waste Characterization, Revision 0
CP-626, Shipment of Radioactive Material Shipping Papers, Revision 00003
CP-628, Solid Waste Processing Resin Transfer, Revision 00101
CP-632, CNS 8-120B Cask Handling Procedure, Revision 2
Energy Solutions Cask Book for Model 8-12B, Revision 32

**Section 4OA1: Performance Indicator Verification**

Procedures
STP-M-673-1, PORV Response Time Test, Revision 00803

Condition Reports
CR-2009-001292
CR-2010-011886
IRE-024-202
IR-2006-000212

Drawings
12965SH0001, ERV Outline Drawing, Revision 6
12119SH0002, Consolidated Electromagnetic Relief Valve 2500# Class, Revision 7

RWP Dosimeter Set Point Reviews
RWP 802, Revision 1
RWP 907, Revision 1
RWP 1002, Revision 0
RWP 1010, Revision 1
RWP 1016, Revision 0
RWP 1017, Revision 0
RWP 1306, Revision 0
RWP 1307, Revision 0
RWP 1311, Revision 0
RWP 1314, Revision 0
RWP 1315, Revision 0
RWP 1400, Revision 0
RWP 1401, Revision 0

**Section 4OA2: Problem Identification and Resolution**

Procedures
CNG-CA-1.01-1007, Performance Improvement Program Trending and Analysis, Revision 00200
CNG-CA-1.01-1000, Corrective Action Program, Revision 00400
CNG-CA-1.01-1005, Apparent Cause Evaluation, Revision 00400

Condition Reports

| | | | |
|---|---|---|---|
| CR-2009-001276 | CR-2008-000895 | CR-2009-006261 | CR-2009-003915 |
| CR-2009-001158 | CR-2008-001799 | CR-2009-006517 | CR-2009-007033 |
| CR-2010-007251 | CR-2008-002999 | CR-2009-001259 | CR-2009-007493 |
| CR-2010-007253 | CR-2009-001158 | CR-2009-003915 | CR-2009-007034 |
| CR-2009-005896 | CR-2009-005896 | CR-2010-004735 | CR-2010-007246 |
| CR-2010-010103 | CR-2010-012320 | CR-2010-012233 | IRE-029-394 |
| IRE-031-155 | | | |

Miscellaneous
System Health Reports, Units 1 and 2, System 77 and 79, Radiation Monitoring, dated from October 2009 to September 2010
Engineering Services Department 3rd Quarter Trend Report
Nuclear Security/Emergency Preparedness/Licensing 3rd Quarter Cognitive Trending Report

**Section 4OA5: Other Activities**

Procedures
CNG-NL-1.01-1011, 10 CFR50.59/10 CFR 72.48 Applicability Determinations, Screenings and Evaluations, Revision 00200
CNG-PR-1.01-1011, Control of Station Specific Procedure Process, Revision 00500
FH-352, NUHOMS - 32P DSC Loading and Unloading, Revision 0300
HE-07, Auxiliary Building Cask Handling Crane Operator's Checklist, Revision 07107
HE-19, Spent Fuel Cask Handling Crane Annual Inspection, Revision 01200
ISFSI – 01, Independent Spent Fuel Storage Installation Loading, Revision 00902
ISFSI – 02, Independent Spent Fuel Storage Installation Unloading, Revision 01100
ISFSI – 03, Independent Spent Fuel Storage Installation Loading NUHOMS – 32P Dry Shielded Canister, Revision 01000

NDE-5.240 – Color Contrast Liquid Penetrant Examination, Revision 1000
PS – 53, Material Control, Revision 0100
ISFSI Technical Specifications, Revision 0900
Updated Safety Analysis Report, Revision 0200

Miscellaneous
Audit ISF-06-01-C, Independent Spent Fuel Storage Installation
Memorandum DE10591, NFM Clarification of Undamaged Fuel for the CCNP
Memorandum DE06223, Maximum Standard Irradiated CE 14x14 Assembly Weight
Independent Spent Fuel Storage Installation Inlet/Outlet Vent Inspection

Condition Reports
CR-2010-010554
CR-2010-010694
Corrective Action CA-2008-000625
Corrective Action CA-2008-000626
Corrective Action CA-2008-000627
Corrective Action CA-2009-0102940

ISFSI RWP 156 Revisions 0, 1, 2

ISFSI Surveys

Dry Storage Canister
10/19/2010 @ 2230
10/20/2010 @ 0100
11/02/2010 @ 1030
11/02/2010 @ 2230

Silver Dollars Installed and Welded
10/21/2010 @ 1500

Dry Storage Canister in Cask Wash Pit with Diamond Deck
10/07/2010 @ 1700

ISFSI Annulus Region Between the Dry Storage Canister and the Transfer Cask
10/07/2010 @ 2030

Horizontal Storage Modules
11/4/2010 @ 1130

# LIST OF ACRONYMS

| | |
|---|---|
| AC | Alternating Current |
| ACE | Apparent Cause Evaluation |
| ADAMS | Agency-Wide Documents Access and Management System |
| AEU | Air Exhaust Unit |
| AFW | Auxiliary Feedwater |
| AHU | Air Handling Unit |
| ALARA | As Low As Reasonably Achievable |
| ASME | American Society of Mechanical Engineers |
| CA | Corrective Action |
| CAP | Corrective Action Program |
| CC | Component Cooling |
| CCNPP | Calvert Cliffs Nuclear Power Plant |
| CFR | Code of Federal Regulations |
| CR | Condition Report |
| CST | Condensate Storage Tank |
| DG | Diesel Generator |
| DC | Direct Current |
| EAL | Emergency Action Level |
| EPRI | Electric Power Research Institute |
| ERO | Emergency Response Organization |
| FIN | Finding |
| HX | Heat Exchanger |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| IR | Inspection Report |
| ISFSI | Independent Spent Fuel Storage Installation |
| kV | Kilovolt |
| LHRA | Locked High Radiation Area |
| LOCI | Loss of Coolant Incident |
| LORT | Licensed Operator Requalification Training |
| LPSI | Low Pressure Safety Injection |
| MSPI | Mitigating Systems Performance Index |
| NCV | Non-Cited Violation |
| NEI | Nuclear Energy Institute |
| NRC | Nuclear Regulatory Commission |
| OE | Operating Experience |
| OOS | Out-Of-Service |
| PARS | Publicly Available Records |
| PI | Performance Indicator |
| PI&R | Problem Identification and Resolution |
| PMT | Post-Maintenance Testing |
| PORV | Power Operated Relief Valve |
| QA | Quality Assurance |
| RCA | Radiologically Controlled Area |
| RG | Regulatory Guide |
| SBO | Station Blackout |
| SDP | Significance Determination Process |
| SE | Safety Evaluation |

| | |
|---|---|
| SG | Steam Generator |
| SI | Safety Injection |
| SIAS | Safety Injection Actuation Signal |
| SM | Shift Manager |
| SR | Safety Related |
| SSC | System, Structure and Component |
| TS | Technical Specification |
| UFSAR | Updated Final Safety Analysis Report |
| URI | Unresolved Item |
| UV | Undervoltage |
| VDC | Volt Direct Current |
| WO | Work Order |